SEVENTY YEARS ANNIVERSARY

Brian Roberts   Paul Yunnie
ACME VENTILATING & HEATING Co
35 Tarleton Street & 20a White Street, Liverpool.
Founded 1870

Acme & Spherical Ventilators, Smoke Cures, and High Pressure Heating.

No. 200.—Acme Wrought Steel Regulating Louvre Ventilators—Inlet or Outlet.

Spherical Ventilators.

Wave Proof

Fig. 2.—Made of 14 G.V.M. Zinc, Copper or Steel, Galvanised after manufacture, and enamel painted. May be fixed vertically or horizontally.

No. 77.—This design is double the price given for Nos. 10 and 76.

Section of Acme Patent Cured Exhaust Louvres.

Fig. 4.—Acme Louvres in Funnels, without Range, for Domes, Wells, &c.

Acme Warming Apparatus, showing Furnace in Basement with coil of piping and enamelled case in entrance hall, &c. Neatest and most efficient high pressure system.

No. 24.—Venetian Outside Wall Inlet, 9 in. by $\frac{1}{2}$ in., 12 in. by $\frac{1}{2}$ in., 10 in. by 3 in., 10 in. by 1 in., 9 in. by $\frac{1}{2}$ in., 12 in. by 6 in., 12 in. by 12 in. Admits three times more air than ordinary perforated air bricks. Walls kept perfectly dry. Superior make, largely used in Smoke Stacks.

No. 30.—Acme Terra Cotta (red) Chimney Cowl with suspended cone, &c., and other smoke cures.

30 Years' Experience.

Acme Ventilating & Heating Co.,
LIVERPOOL.

Apply for fuller particulars.

Telegrams—"Keyworth." Telephone 1777.

( xxl.)

1904 Advertisement
INTRODUCTION

Liverpool can trace its origins back to 1207 when King John granted its first Charter. It became a major mercantile centre with trading links around the globe and still retains a magnificent architectural heritage with some 2500 listed buildings. And all these buildings have depended upon their engineering services to make them functional and the occupants comfortable. These services encompass heating, ventilation, refrigeration, air conditioning, hot and cold water, public health, lighting, power, fire-fighting, vertical transportation, and other specialist engineering.

The Chartered Institution of Building Services Engineers (CIBSE), founded more than a century ago in 1897 as the Institution of Heating & Ventilating Engineers, represents today’s building services engineers. A kindred body, now part of CIBSE, was the Illuminating Engineering Society (IES), founded in 1909. The present CIBSE is represented by Regions across the UK and by a number of specialist Groups and Societies, including the Society of Light & Lighting (SLL), the Society of Public Health Engineers (SoPHE) and the Society of Facade Engineering (SFE).

The IHVE Liverpool Branch was set up in 1933, being the first branch outside of London. It now operates as the CIBSE Merseyside & North Wales Region and recently reached its 70th Anniversary. This book celebrates that anniversary and recalls just a few of the pioneering people and companies and some of the buildings and services that make up part of the history of this area.
The President for the year was Chas R Honiball of Liverpool. The first day was taken up with Institution reports and other business and the awards for best papers of the past year. The social events and visits were described in IHVE Proceedings:

The members and ladies journeyed by train to Fleetwood, thence by steamer to Barrow, thence to Lakeside by train where an excellent luncheon was provided by the President. Afterwards the party travelled by steam launch to Ambleside and by coaches to Coniston where tea was served before the return journey was commenced. In commemoration of the Southport Meeting the President gave a badge to all who were present.

The next day some of the members visited the New Mechanical and Electrical Engineering Laboratories of Liverpool University and also inspected the Heating and Ventilating arrangements of St George’s Hall, Technical School Library, Museum, Art Gallery, &c, in Liverpool accompanied by the President, and this terminated a very enjoyable time, long to be remembered by those who were able to attend the Summer Meeting.
Born in Liverpool. Received his general education in the public schools and his scientific education in the School of Science and University College of Liverpool. In 1877 he was apprenticed for 7 years to the firm of David Crawford & Co, marine and general engineers, with whom he remained until 1889. During this time, he engaged in the warming and ventilating of steamships, steam and heat engineering. In 1889 he joined the Liverpool Engineering Condenser Co Ltd as Work’s Manager. In 1893 he was appointed Chief Designer and carried out a considerable amount of research and experimental work.

Chas Honiball set up his own company in 1901, specialising in the development and execution of heating, ventilating, cooling, refrigeration and electrical work. He took a keen interest in the technical education of engineers as lecturer in engineering science in the evening Technical Schools of Liverpool.

He joined the Institution of Heating & Ventilating Engineers in 1905. In 1907 he was awarded the IHVE Bronze Medal for his paper, “The warming of steamships” and in 1911, their Silver Medal for two papers on “Humidity of Air.” In 1907 he wrote a detailed description and evaluation, “The mechanical ventilation and warming of St George’s Hall, Liverpool.”

He was MIMechE, a member of the Liverpool Engineering Society, Vice-President of the National Association of Master Heating & Domestic Engineers, Member of the American Society of Heating & Ventilating Engineers, as well as a Member of the Cold Storage & Ice Association and several other Scientific Societies.
Dr David Boswell Reid, 1805-63
Scottish doctor, chemist & ventilating engineer. Researched fresh air needs. Devised the heating & ventilating of St George’s Hall, Liverpool which is now considered a landmark installation

Jno S Palmer, d.1909
President IHVE 1904
Worked for Syphons, heating contractors of Liverpool. Was not a professional engineer but a very active member of Council during the formative years of the IHVE and an expert on the steam fitting trade
George Nelson Haden OBE, 1900-60
President IHVE 1938
Chairman G N Haden & Sons Ltd. Had a distinguished career. Awarded IHVE Gold Medal 1959. Carried out tests in 1921 at Liverpool Cathedral using big hydrogen balloons on fine silk to discover the dramatic effects of draughts caused by wind on the huge stained glass windows

Prof J S Haldane MD FRS, 1860-1936
Pioneering investigator in respiration, air analysis and airflow.
Ventilation consultant for the Mersey Tunnel
Harvey Lonsdale Elmes drew up the original plans with the interior design inspired by the Roman Baths of Caracalla. The building has been described as perhaps the finest neoclassical building in England. But when in 1847 Elmes died of consumption at an early age his great work was completed by Professor C R Cockerell. Dr David Boswell Reid was engaged to design a heating and ventilating system, not included in Elme’s scheme, but now instigated by the city surveyor, Dr W H Duncan, concerned that infectious diseases seemed to spread due to lack of proper ventilation. In Reid’s design air was taken into the building through two shafts and warmed by five batteries of hot water pipes served from four boilers. Natural convection of the heated air was assisted by a 16 hp steam engine driving four 10 ft fans. Cold-water sprays in the main shaft cooled and cleaned the incoming air, which was introduced behind sculptures in the Great Hall and through risers in the seating tiers in other rooms. Vitiated air was exhausted through grilles incorporated in the decorative ceilings, passing into the roof space, its movement aided by gas burners sited in shafts at the corners of the Great Hall. Heating and cooling of the various zones of the building was accomplished by a small army of workers in the basement controlling the passage of air by canvas flaps and doors connected to a system of pulleys and ropes. Much of Reid’s system is still in place today.
Longitudinal Section of St George’s Hall. The four main fans (marked B), each 10 ft in diameter, were driven by a 16 hp steam engine.

ST GEORGE’S HALL

Beneath Organ Gallery

Roof Space over the Great Hall
Vaulted ceiling of hollow brick with perforations for exhaust air extraction

St George’s Hall Heating Chamber and Coils as Existing Today
Chirk Castle, near Wrexham, is a magnificent Marcher fortress completed in 1310. The first central heating appears to have been accomplished by a warm air system serving the principal rooms, but only blocked-off floor and wall grilles remain. The present hot water heating system employs radiators suggestive of a date between the two World Wars. There is a nameboard C Seward & Co Ltd, heating engineers of Chester. Their origins can be traced back to Abraham Seward, who in 1797 was appointed Tinsmith Worker in Ordinary to King George III. Chirk had its own plant for manufacturing town’s gas installed in 1857, but only the ruins remain. There are various gas chandeliers now converted to electricity. The castle later had a dc generating plant powered by a water turbine, thought to be c.1900. The electrical contractor was the Manchester office of Drake & Gorham and there are remains of a marble switchboard with rewirable fuses and knifeblade switches. There is also a Drake & Gorham electric bell call system with two annunciator panels, a relay panel, and associated bell pushes. There are the remains of a vertical domestic hws boiler in the laundry, but the nameplate is illegible. The kitchen contains a “Jack Fire” and bread oven, both by W J Smith, Pont Street, Belgrave Sq, WC.
1857 The Gas Works, Chirk Castle
The engineer was Robert Roberts [Picture National Trust]
Once a medieval castle, the oldest part of this Welsh stronghold possibly dates back to around 1200. The architect G F Bodley carried out a well-judged restoration from 1902. Powis Castle was bequeathed to the National Trust in 1952. A Heritage Group survey found that open fires apparently heated the property until the remodelling by Bodley, when Richard Crittall & Company, established in 1884, installed a low-pressure hot water heating system. Some radiators bear an ARC (American Radiator Co) monogram; others have the Crittall name on the handwheel of the radiator valve. Both tubular radiators and models by the American Radiator Company were found. Artificial lighting was originally by oil lamps and candles until the castle switched to electric lighting, fed from its own generator (now removed). Examples of wooden cable trunking still exist. A Haden warm air stove, in extremely poor and dilapidated condition, was discovered in the Orangery. A search of Haden records reveals that a stove and a hot water boiler were supplied to Earl Powis in 1842.
The house was built in the 16th century by the Norris family, passing to the National Trust in 1941. The central heating system was installed in two phases. The original 1895 installation used cast iron socket and spigot pipework serving a variety of pipe coil heaters, mainly in corridors and hallways. These heating coils are of a size and style not previously found elsewhere by the Heritage Group. For example, that in the Great Hall is 10 pipes high and 4 rows deep. The heating system was upgraded around 1910 and serves perimeter rooms using steel pipe and wrought iron fittings feeding cast iron sectional radiators. Both phases appear to have been installed by Charles Seward of Preston, founded as a branch of A Seward of Lancaster.
1872 Seamen’s Orphanage, Newsham Park, Liverpool
Architect Alfred Waterhouse. Heating by Haden’s hot water system

1931 Warrington Training College
Architects Slater & Moberly. Heating by Haden
1908-11 The Royal Liver Building, Pierhead, Liverpool
Architect W Aubrey Thomas. Panel heating and mechanical ventilation by Crittall

1928 New India Building, Liverpool
Architects Thorneley & Rose
Panel heating by Crittall

1934 Mersey Tunnel
Panel heating at Control Station by Crittall
BRIGHTSIDE FOUNDRY & ENG Co Ltd
242 Upper Parliament Street, Liverpool
Founded in Sheffield in 1865

1929 Williamson Art Gallery, Birkenhead
Architects Hannaford & Thearle. Heating & ventilation by Brightside

1935 Liverpool Orphanage, Woolton
Architects Barnish, Silcock & Thearle. Engineering services by Brightside

1936 Corporation Swimming Baths, Liverpool
J A Davenport (Baths Manager, Corporation of Liverpool). Engineering services by Brightside
The Liverpool Cathedral Church of Christ is built on St James’ Mount and visible for many miles around. The decision to build was that of Bishop Francis James Chavasse in 1901. After an open competition, a design by an unknown 22-year-old architect was chosen. His name was (Sir) Giles Gilbert Scott. [Scott worked on the cathedral until his death in 1960, even longer than Wren worked on St Paul’s.] King Edward VII laid the foundation stone in 1907. The main parts of the cathedral were consecrated in 1924, but the first service in the completed Cathedral Space was not until 1940. This, the largest cathedral in Britain, was not fully completed until 1978. The building is 619 ft long and covers over 100,000 sq ft. The height of the nave vault is 120 ft, while that of the tower is 331 ft.

The planned heating underwent changes over the early years. As G Nelson Haden was later to recount to the Institution of Heating & Ventilation Engineers, the original Edwardian proposal was “to heat the cathedral by low pressure hot water radiators and the direct introduction and recirculation of warm air. In 1919 a new system was suggested...Almost the whole floor was heated by a system of closed warm-air ducts” (adopting the principle used by the Romans in their hypocaust). As a precaution big banks of radiators were installed in entrances and under the clerestory windows “to prevent the usual anticipated down-draught.”
The Interior Today

The Exterior

Original Haden Warm Air Apparatus

1931 Oil Firing Conversion

Centrifugal Fan Set Today
1934 MERSEY TUNNEL VENTILATION

Souvenir Book

Kings Square Entrance, Birkenhead

Opening by King George V and Queen Mary

Georges Dock & N John St Ventilation Towers
The fan contract was split between Sturtevant Engineering, who supplied their GV/M [Grand Vitesse Mersey] design and Walker Bros (Wigan) Ltd, who provided their Indestructible design. Operating supply flow rate overall was 1917 m$^3$/s. Extract flow rate was 1211 m$^3$/s.

Sturtevant Fan

Walker Fan

Walker Fan Impeller
About twice the Sturtevant diameter with a maximum speed of only 62 rev/min
RENTON GIBBS & COMPANY Ltd
St James’ Works, Mill Street, Liverpool
Established 1868

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Also in Birmingham, Sheffield & Madrid

The Office
COCHRAN & COMPANY
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Established 1878

1876 Original Cochran Boiler
1879 ‘Resurgam’ Steam Submarine
1904 Cochran Boiler at Colliery Exhibition, London

Cut-a-way of Cochran Boiler
1899 Cochran Steam Crane, Newbie Pier
The LIVERPOOL REFRIGERATION Co Ltd
Photographs date from 1908

Belt-driven Compressor
Ammonia Condenser
Submerged Condenser
Making Ice by the Can System
A tapered can, nearly filled with cold water, was placed in a tank of cold brine

Making Ice by the Cell System
Thin hollow castings (cells) were placed in a brine tank, filled with water, making 500 lb ice blocks
1965 CADBURYBROS. LTD, MORETON
AIR CONDITIONING by BRIGHTSIDE HEATING & ENG Co Ltd

Packing Area
Single duct high velocity system

Close Controlled Temperature Room
Special air treatment system

Confectionery Cold Store
Low velocity system, direct-expansion refrigeration with defrost arrangements
CREDITS

Brian Roberts and Paul Yunnie are respectively Chairman and Vice-Chairman of the CIBSE Heritage Group and have written and produced this Anniversary publication with the help of members of the Group and of the CIBSE Merseyside and North Wales Region. In particular, surveys and photographs of various buildings have been carried out and other assistance rendered by Mike Barber, Geoff Brundrett, Frank Ferris and Neil Sturrock. Other illustrations are taken from the Heritage Group Collection and trade literature in the CIBSE Library.